

LERN STROKE LEVEL III “ACUTE STROKE READY” HOSPITAL TOOLKIT



LOUISIANA
EMERGENCY
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Right Place. Right Time. Right Care.

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ACUTE STROKE READY HOSPITALS (LERN LEVEL III)

Definitions

Acute Stroke Ready Hospitals (ASRH) have been defined by the American Heart Association/American Stroke Association as “hospitals that are not Primary Stroke Centers, yet can provide timely, evidence-based care to most patients with an acute stroke.”¹ The Louisiana Emergency Response Network (LERN) recognizes ASRHs as Level III Stroke Centers. Another term used for ASRHs is “spokes.” “Stroke Receiving Facilities” include Level I, II, and III Stroke Centers.

This toolkit is designed to provide hospitals with the necessary information and requirements to become an ASRH, otherwise referred to as a LERN Level III Stroke Hospital.

Background

One out of four deaths in Louisiana is caused by heart disease. In 2006, 2,195 Louisianians died from stroke (5.5% of total deaths in Louisiana).² In 2010, there were 16,840 patients discharged from hospitals with a stroke diagnosis in Louisiana.³ Nationally, there are 795,000 new stroke cases every year. That equates to one stroke every 40 seconds. Furthermore, stroke is the fourth leading cause of death and it is the #1 cause for new nursing home admissions. LERN recognizes that all hospitals do not have the capabilities to become Primary Stroke Centers. However, by becoming an ASRH in Louisiana, a hospital signals to its community that it is committed to the best nationally accepted standards of acute stroke treatment.

Why Become an Acute Stroke Ready Hospital?

The goal of the LERN Stroke Initiative is to develop a statewide system of stroke care to provide access to care proven to improve outcomes for Louisiana citizens regardless of where they live in the state. To accomplish this, we must identify and support the network of hospital providers that are committed to providing timely, evidence-based care to most patients with an acute stroke. Recent studies have shown that more than 50% of the US population is not within 60 minutes of a Primary Stroke Center. This gap also exists in Louisiana where there are 10 Primary Stroke Centers and two Comprehensive Stroke Centers clustered in metropolitan areas. In order to close this gap, the system consists of a “hub and spoke” model, where the “hub” hospitals are Health Care Accreditation Program (HFAP) Certified Primary Stroke Centers, Joint Commission Primary, and Comprehensive Stroke Centers and the “spoke” hospitals are ASRHs. Hub hospitals act as the expert resource centers for the spoke hospitals, when needed. To function as a spoke within the system of care requires organization and adoption of protocols, policies, data collection, and performance improvement initiatives.

The ASRH (or LERN Level III hospital) is vital to improving stroke outcomes for the citizens of Louisiana, since the ratio of potential Level III hospitals to Level I or II hospitals is 4:1. Per the American Stroke Association, the vision and intent of the ASRH is to provide initial diagnostic services, stabilization, emergent care, and therapies to patients with an acute stroke who are seen in their Emergency Department (ED).

¹ Louisiana Fact Sheet: Center for Disease Control. Web 3 Jan 2014. http://www.cdc.gov/dhdsdp/programs/nhdsp_program/la.htm

² National Vital Statistics Report (2009)

³ Louisiana Department of Health and Hospitals, Center for Health Care Innovation and Technology

What Does an Acute Stroke Ready Hospital Do?

An Acute Stroke Ready Hospital (“spoke” hospital) will provide immediate and time-critical care to the stroke patient, including initial emergency evaluation and screening, stroke scale assessment, and, if indicated, thrombolytic treatment. Using standardized and evidence-based protocols, these Stroke Receiving Facilities will be able to provide the optimum level of care to the acute stroke patient. To assist in this evaluation and decision-making, spoke hospitals will have 24-hour access to the expert neurologic resources internally or via hub hospitals (Primary or Comprehensive Stroke Centers) for consultation. Local Emergency Medical Services (EMS) agencies will be notified that an ASRH has been identified by LERN and is “stroke ready” to receive acute stroke patients as identified by EMS personnel in the field. The intent of this approach is to get the patient to a facility that can provide appropriate acute stroke care as quickly as possible, with efficient and safe administration of thrombolytic treatment at the foundation of care.

The Chief Executive Officer of any hospital of any size and location that meets the LERN Level III criteria (page 5) may sign an attestation that states they meet the LERN requirements. The LERN Tri-Regional Registered Nurse Coordinator will schedule a meeting with hospital administration to discuss and verify key requirements. If criteria are met, EMS agencies in the area will then be notified that suspected stroke patients might be transported to this facility.

The use of the standardized pre-hospital LERN Stroke Care Guideline and the Stroke Destination Protocol will reduce the time of treatment for patients with acute ischemic strokes who may benefit from thrombolysis by facilitating early identification, communication, and delivery of the stroke patient to the closest ASRH. It will also reduce delays and improve the overall care of other stroke patients who may not qualify for intravenous thrombolysis such as:

- Stroke symptoms with duration more than the institutional window for thrombolytic treatment
- Hemorrhagic strokes
- Patients with completely resolved symptoms suggestive of transient ischemic attack (TIA)

What Does this Toolkit Do?

This toolkit will provide medical professionals and hospital administrators the necessary information to improve their hospital’s acute stroke care and become an ASRH in Louisiana. Each hospital is invited to review the information contained in this toolkit and plan its ASRH implementation.

Acute Stroke Ready Hospital Requirements (LERN Level III Stroke Hospital)

- 1) Facilities in this category will provide timely access to stroke care but may not be able to meet all the criteria specified in LERN Level I and Level II guidelines. These centers will provide acute stroke care in urban and rural areas where transportation and access are limited and is intended to recognize those models of care delivery that have shown utility including “drip-and-ship” and telemedicine. Because these centers can provide care faster, these centers should not be bypassed to go to a more distant LERN Level I or Level II Hospital.
- 2) Emergency department physician-staffed 24/7.
 - a. Perform initial ER physician evaluation within 10 minutes of patient arrival.
 - b. Contact with neurological expertise within 15 minutes.
- 3) Ability to perform CT on site within 25 minutes of patient arrival and interpret within 45 minutes.
- 4) Ability to draw and report results of appropriate lab work within 45 minutes of patient arrival (CBC, platelet count, PT, PTT, INR, chemistry panel).
- 5) Access to neurological expertise by phone or telemedicine within 15 minutes of arrival.
- 6) Proficiency in delivery of tPA and ongoing training programs for care delivery of tPA.
 - a. Ensure door-to-drug (needle) time is within 60 minutes.
 - b. If appropriate, transfer patient to an appropriate higher level of care within 3 hours of arrival.
- 7) Personnel: Emergency physician.
- 8) Infrastructure: Emergency Room, if the hospital does not have an Intensive Care Unit (ICU) then patient transfer should be considered after tPA administration.
- 9) Diagnostic techniques: 24/7 CT, 24/7 laboratory.
- 10) Written care protocols and order sets for stroke, including guidelines, algorithms, critical care pathways, and NIH Stroke Scale training.
- 11) Written documentation of a plan for secondary transfer to a LERN Level 1, Level 2, or other appropriate facility if resources deemed necessary are not available at the primary destination site.
- 12) Quality of stroke care demonstrated by involvement in quality control program such as American Stroke Association “Get With the Guidelines” or submission of data to LERN that indicates compliance with CMS Stroke Core Measures.

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Note:

Acute Stroke Ready Hospitals (ASRHs) are encouraged to keep uncomplicated stroke patients during the duration of treatment if the facility is comfortable with the post-acute stroke care. Post-thrombolytic patients must be transferred to a higher level of care if an ICU is not available. Transfer agreements with Primary and Comprehensive Stroke Centers are important and strongly encouraged. ASRHs are required to have written documentation of a plan for secondary transfer to a LERN Level I Comprehensive Stroke Center (CSC), Level II Primary Stroke Center (PSC), or another appropriate facility, if resources deemed necessary are not available at the ASRH.

The following are Louisiana Emergency Response Network contacts for the LERN Stroke System. Any questions on planning and operations can be directed to:

Sheryl Martin-Schild, MD, PhD, FANA, FAHA

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Assistant Professor of Neurology
Director of the Stroke Program
Clinical Assistant Professor of Medicine
Tulane University Health Science Center
LERN Stroke Medical Director
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LERN Tri-Regional Coordinator
Stroke Lead
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(225) 456-3803

Acute Stroke Ready Hospital Application Process

- 1) Hospitals wishing to become an ASRH must have their Chief Executive Officer submit a signed letter attesting to meeting the ASRH requirements.

Attestation letters may be requested from and returned to:

Paige B. Hargrove, BSN, RN
Louisiana Emergency Response Network
14141 Airline Highway, Suite B, Building 1
Baton Rouge, LA 70817

The attestation letter can also be accessed at:

<http://lern.la.gov/lern-stroke-system/hospital-stroke-level/>

Or

Hospitals that obtain certification from the Healthcare Facilities Accreditation Program (HFAP) as an ASRH must submit a copy of the certification. **Data submission to LERN is NOT required for Level III hospitals who obtain HFAP certification.**

- 2) Upon receipt of the completed attestation letter, the LERN Tri-Regional Registered Nurse Coordinator will schedule a meeting with hospital administration to discuss and verify key requirements.
- 3) Data elements identified on pages **21–23 of this toolkit** must be submitted with the initial application and then quarterly to the LERN.

MEDICAL TREATMENT AND PROTOCOL

EMS Assessment and Management

Emergency Department Initial Evaluation and Treatment

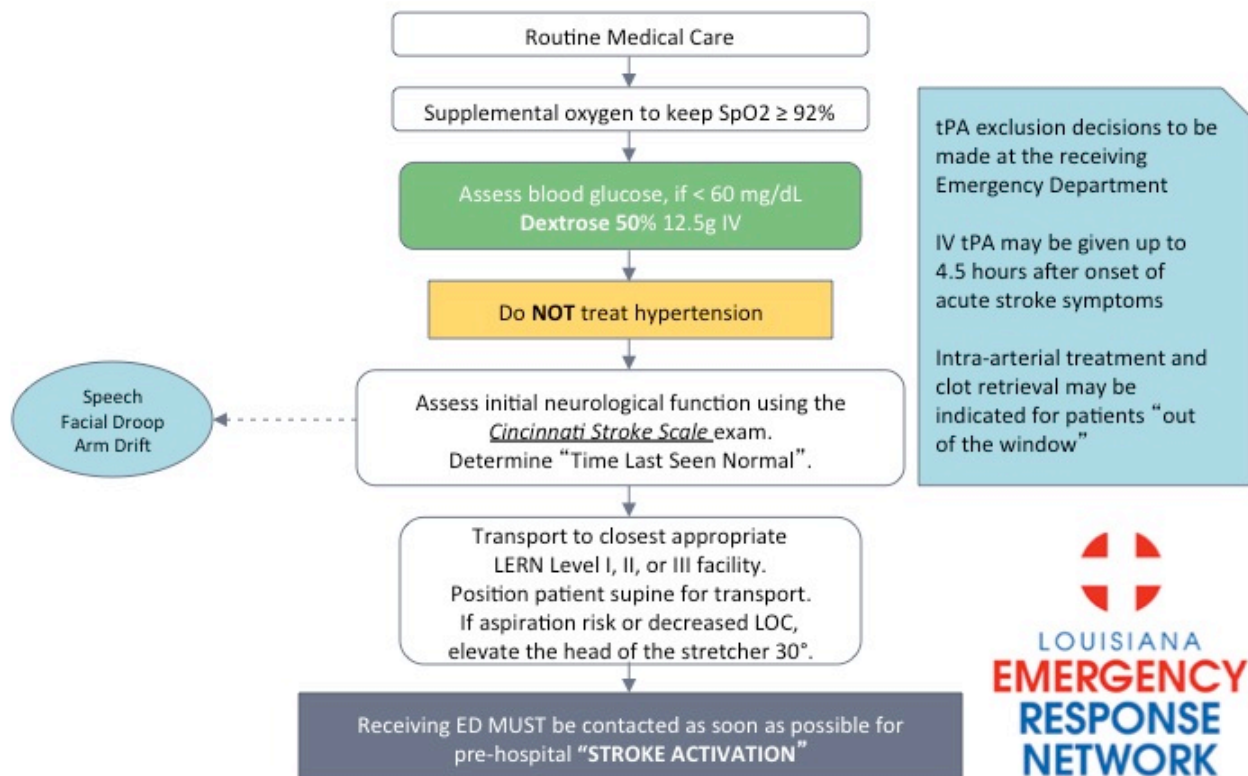
The following are recommended “model” protocols for consideration by EMS agencies and Emergency Departments (ED). They are evidence-based recommendations developed by a panel of EMS and stroke experts. These have been approved by the LERN Board.

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LERN STROKE CARE GUIDELINE

Determine Onset of Focal Neurological Symptoms "Time Last Seen Normal"

As pre-hospital providers our hands on care for stroke victims is limited. Therefore, our next crucial role in caring for stroke victims is geared toward recognition. The *Cincinnati Stroke Scale* shall be used as a quick stroke screening tool. The MEND may be utilized during transport if it DOES NOT DELAY TRANSPORT. The detailed testing of neurological function should be completed enroute to the ED. If present, transport bystander/family member to the ED with pertinent medical information.



Prior to concluding the Medical Control radio report, identify who will be notifying the receiving ED (EMS or Medical Control). Transport to a hospital that has neurological services and a functional CT scanner.

A neurosurgeon is not required for an ED to accept an active stroke.

- Patients who awaken from sleep with neurological deficits must still be transported to a hospital with neurological services and a functional CT scanner.
- Treat hypotension as per protocol to improve perfusion
- To assist in tPA screening, ask "Have you been admitted to the hospital within the past 3 months?"
- Treat generalized seizure activity aggressively per protocol

*Jauch EC, Saver JL, Adams HP Jr., Bruno A, Connors JJ, Demaerschalk BM, et al., American Heart Association Stroke Council, Council on Cardiovascular Nursing, Council on Peripheral Vascular Disease, and Council on Clinical Cardiology. Guidelines for the early management of patients with acute ischemic stroke: a guideline for healthcare professionals from the American Heart Association/American Stroke Association. *Stroke*. 2013;44:870-947.

EMS Assessment and Management Guidelines

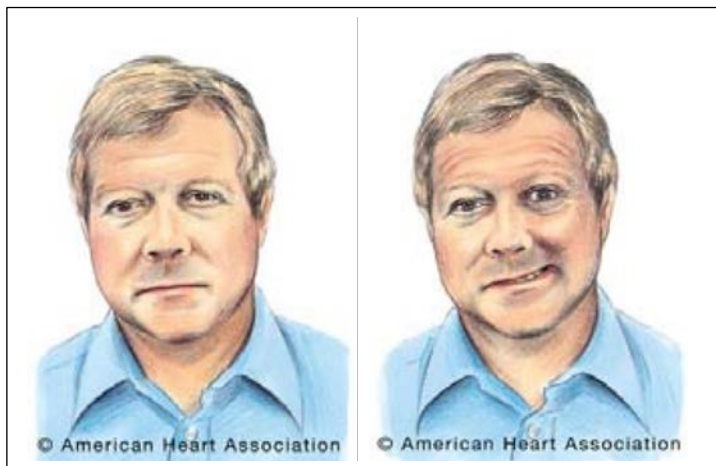
Prompt stroke recognition and treatment by EMS is a critical component of acute stroke care. As an integral part of the Louisiana Stroke System, we strongly encourage EMS to use a standardized pre-hospital treatment protocol for suspected stroke patients. The following model EMS stroke protocol is provided as a guideline.

Step-by-Step Instructions

On the Scene:

- 1) Manage ABCs (Airway, Breathing, and Circulation). Give oxygen if needed.
- 2) Perform pre-hospital stroke assessment using the *Cincinnati Stroke Scale*.*

- **Facial Droop** (have patient smile)
 - **Normal:** Both sides of face move equally
 - **Abnormal:** One side of face does not move as well



- **Arm Drift** (have patient hold arms out for 10 seconds)
 - **Normal:** Both arms move equally or not at all
 - **Abnormal:** One arm drifts compared to the other, or does not move at all



Patients with 1 of these 3 findings as a new event have a 72% probability of an ischemic stroke. If all 3 findings are present, the probability of an acute stroke is more than 85%.

*Photos from <http://www.strokecenter.org/trials/scales/cincinnati.html>

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- **Speech** (have patient speak a simple sentence)
 - **Normal:** Patient uses correct words with no slurring
 - **Abnormal:** Slurred or inappropriate words, or mute

3) Establish and record an **exact time**, in military time, when patient was “Last Known Normal”.

In Transit:

- 1) Rapidly transport to closest Stroke Receiving Facility (Comprehensive Stroke Center, Primary Stroke Center or Acute Stroke Ready Hospital), unless the patient is medically unstable.
- 2) Bring witness or family member if possible, or record the names and phone numbers of witnesses.
- 3) Alert the receiving emergency department that a suspected stroke patient is en route, so they can begin to activate their acute stroke team and be ready on arrival.
- 4) Check and record blood glucose to assess for hypoglycemia.
- 5) Check and record blood pressure. Do NOT administer any hypertensive medication without physician approval.
- 6) Establish cardiac monitoring and IV access with large bore catheter, if possible.
- 7) Keep NPO.
- 8) Bring medications or medication list.

Physician Acute Stroke Checklist to Determine tPA Eligibility and Administration

Eligibility for IV Treatment With tPA*

- Age 18 or older
- Clinical diagnosis of ischemic stroke causing a measurable neurological deficit
- Time of symptom onset less than 180 minutes before treatment would begin

AHA/ASA Exclusions for tPA

- CT of the head demonstrates hemorrhage or intracerebral mass lesion (meningioma is not an exclusion)
- History of previous intracerebral hemorrhage
- Intracranial surgery, serious head trauma or prior stroke in previous three months
- Symptoms characteristic of SAH
- Evidence of active bleeding or acute trauma (fracture) on exam
- BP Systolic > 185 or Diastolic > 110 at time of treatment
- Platelet count < 100,000
- If receiving Heparin in last 48 hours, PTT outside of normal range
- If on warfarin (Coumadin), INR > 1.7
- Current use of new oral anticoagulants within last two days (Dabigatran/Pradaxa, rivaroxaban/Xarelto, apixaban/Eliquis, edoxaban/Lixiana)

AHA/ASA Warnings for tPA*

- Neurological signs clearing spontaneously
- Neurological signs minor and isolated
- Blood glucose < 50mg/dl
- Myocardial infarction in past three months
- Major surgery in past 14 days
- Arterial puncture at noncompressible site in the past seven days
- GI or GU hemorrhage in the past 21 days
- Seizure with postictal residual neurological impairments
- Multilobar infarction (hypodensity > 1/3 cerebral hemisphere on CT)

**** The reason for withholding tPA to all patients with suspected stroke must be concisely documented as this is a CMS Stroke Core Measure.***

Intravenous tPA is a Class I: Level of Evidence A recommendation for patients who have no exclusion and can be treated within three hours of onset. The door-to-needle time should be within 60 minutes.

Intravenous tPA is a Class I: Level of Evidence B recommendation for patients who can be treated within 3-4.5 hours of onset, with additional relative exclusion criteria, depending on institutional protocol. Written informed consent should be obtained, since this window is off-label.

Jauch EC, et al. Guidelines for the early management of patients with acute ischemic stroke: a guideline for healthcare professionals from the American Heart Association/American Stroke Association. Stroke 2013;44(3):870-947. PMID 23370205

LERN STROKE TOOLKIT

Sample Alteplase (tPA) Order Set for Acute Stroke

STAT LABEL GOES HERE

DANGEROUS/UNACCEPTABLE ABBREVIATIONS - DO NOT USE

QD QOD U IU MS MSO4 MgSO4 Trailing Zero Lack of leading Zero

ALL PRN MEDICATIONS ORDERED MUST HAVE A REASON *

Date Ordered	Time Ordered	PHYSICIAN'S ORDER

Patient Weight	kg	() Estimated
Dosing: Use the 100 mg vial (100mg/100ml=1mg/ml)		
Reconstitution: Add diluent to powder using the transfer device. Gently roll or swirl the mixture for a few seconds until the contents of the vial are clear. DO NOT SHAKE!		
Alteplase (tPA) Infusion (1mg/ml) See Alteplase infusion guide		
Total Dose= 0.9 mg/kg (never exceeds 90 mg) =		mg
Loading Dose= 0.09mg/kg (10% of total dose) =		mg IV over one minute
Infusion Dose= 0.81mg/kg (90% of total dose) =		mg IV over one hour Discard
Amount= 100 ml minus Total Dose administered =		ml
Bleeding Precautions: For 24 hours after tPA administration, unless specifically ordered by MD:		
(X) Do not give any antiplatelet or anticoagulant medication		
(X) Avoid insertion of NGT, Foley catheter and administer nothing per rectum		
(X) Avoid central line placement/ arterial puncture/ IM Injections		
(X) If bleeding occurs, apply manual pressure to site for at least 10 minutes or until bleeding stops, call MD if bleeding does not stop.		
Nursing: Notify Physician for:		
(X) Change in mental status	(X) Angioedema of lips or tongue	
(X) Urine Output >300ml/hr or <30ml/hr	(X) Signs and symptoms of bleeding	
(X) If unable to maintain SBP < 180 or < _____ with prescribed interventions		
(X) If unable to maintain DBP < 105 or < _____ with prescribed interventions		
(X) Respiratory Rate > 24 or < 8	(X) Heart Rate > 120 or < 50	
(X) New onset or worsening headache	(X) Temp > 37.2° C/ 99° F	
(X) Total mini-NIHSS increases by > 2 points	(X) LOC 1a increases after tPA initiated	
PHYSICIAN	PAGER NUMBER	

The Louisiana Emergency Response Network provides this as an example order set. It is not a LERN approved order set. Any use or adoption must be approved by your hospital's internal policy and procedure.

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STAT LABEL GOES HERE

DANGEROUS/UNACCEPTABLE ABBREVIATIONS - DO NOT USE		
QD QOD U IU MS MS04 MgSO4 Trailing Zero Lack of leading Zero		
ALL PRN MEDICATIONS ORDERED MUST HAVE A REASON *		
Date Ordered	Time Ordered	PHYSICIAN'S ORDER
<p>Medications: (X) Labetalol 20 mg IV every 20 mins X 2 PRN SBP> 180 or DBP>105. Hold if HR < 65 (X) Cardene/nicardipine 0.2mg/ml IV. Initiate at 2.5 mg/hr PRN SBP>180-200 or DBP >105. Initiate at 5mg/hr if SBP>200. Titrate in increments of 2.5 mg/hr as often as every 15 minutes to maintain above parameters. Max 15mg/hr</p> <p>Nursing: (X) Vital signs and neuro checks every 15 minutes for 2 hours after start of tPA then every 30 minutes for 6 hours then hourly for total of 24 hours utilizing the following flow-sheet.</p> <p>Time tPA Initiated: _____ Time tPA Discontinued or Completed _____</p>		

	Time of Bolus	15 Minutes	30 Minutes	45 Minutes	1 Hour	1 Hour & 15 Minutes	1 Hour & 30 Minutes	1 Hour & 45 Minutes	2 Hours
Date/Time									
Blood Pressure									
Heart Rate									
LOC 1a									
LOC 1b									
LOC 1c									
Motor RUE									
Motor LUE									
Motor RLE									
Motor LLE									
Total mini-NIHSS									
Initials									
Intervention? Y/N*									

*Further explanation of intervention must be documented in chart/EMR.

**Monitoring flowsheet between 2 and 15 Hours not included to reduce the size of this document.

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LERN STROKE TOOLKIT

STAT LABEL GOES HERE

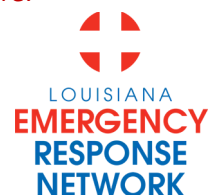
DANGEROUS/UNACCEPTABLE ABBREVIATIONS - DO NOT USE										
QD QOD U IU MS MS04 MgSO4 Trailing Zero Lack of leading Zero										
ALL PRN MEDICATIONS ORDERED MUST HAVE A REASON *										
Date Ordered	Time Ordered				PHYSICIAN'S ORDER					
	15 Hours	16 Hours	17 Hours	18 Hours	19 Hours	20 Hours	21 Hours	22 Hours	23 Hours	24 Hours
Date/Time										
Blood pressure										
Heart Rate										
LOC 1a										
LOC 1b										
LOC 1c										
Motor RUE										
Motor LUE										
Motor RLE										
Motor LLE										
Total mini-NIHSS										
Initials										
Intervention? Y/N*										
Scoring for Mini-NIHSS 1a. Level of Consciousness					0 = Alert; keenly responsive. 1 = Drowsy; arousable by minor stimulation 2 = Stuporous; requires repeated stimulation to attend, or is obtunded and requires strong or painful stimulation to make movements. 3 = Coma; responds only with reflex motor or autonomic effects or totally unresponsive, flaccid, and areflexic.					
1b. LOC Questions: The patient is asked the month and his/her age. The answer must be correct-there is no partial credit for being close. If intubated, arbitrarily score 1.					0 = Answers both questions correctly. 1 = Answers one questions correctly. 2 = Answers neither questions correctly.					
1c. LOC Commands: The patient is asked to open and close the eyes and then to grip and release the non-paretic hand. Demonstration is permitted.					0 = Performs both tasks correctly. 1 = Performs one task correctly. 2 = Performs neither task correctly.					
Motor Arm: The limb is placed in the appropriate position: extend the arms (palms down) 45 degrees. 10 second count for arm. Motor Leg: The limb is placed at 30 degrees. 5 second count for leg. Demonstration is permitted. Each limb is tested in turn, beginning with the non-paretic side.					0 = No drift ; limbs holds for full count. 1 = Drift ; drifts before full count; does not hit the bed or other support. 2 = Some effort against gravity ; limb cannot get to, or maintain position, drifts to bed, but has some effort against gravity. 3 = No effort against gravity ; limb falls 4 = No movement .					

*Further explanation of intervention must be documented in chart/EMR.

Nurse Signature/ Initials _____

Nurse Signature/ Initials _____

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TISSUE PLASMINOGEN ACTIVATOR (tPA)

Complications with tPA

Reasons to Suspect tPA-Related Hemorrhage

- Neurological decline (suggest using mini NIHSS increase of \geq two points)
- Sudden changes in blood pressure or heart rate
- Decline in level of consciousness
- Seizure
- Nausea/vomiting
- Severe or worsening headache

Suggested Treatment Guideline

- 1) Stop tPA if still infusing
 - 2) Type & Cross
 - 3) Send fibrinogen level (goal $>100\text{mg/dl}$) and coagulation profile
 - 4) STAT CT of head without contrast
- If no ICH, resume tPA.
 - If ICH consider:
 - Give 8-10 units of cryoprecipitate
 - May use Fresh Frozen Plasma (FFP) or Prothrombin Complex Concentrate if no cryoprecipitate available, but FFP does not have sufficient fibrinogen
 - Give 6 units of platelets
 - Consider neurosurgery consult

* There are no evidence-based guidelines for the management of tPA-related hemorrhage.

**Rasler F. Emergency treatment of hemorrhagic complications of thrombolysis. Ann Emerg Med. 2007;50(4):485.

Suggested Treatment for Angioedema

Angioedema occurs in about 5% of cases (higher risk if taking ACE-inhibitor) and typically involves the tongue, lips, or oropharynx. Monitoring after tPA is recommended. If angioedema occurs, close monitoring of the airway is necessary. Empiric treatment with intravenous ranitidine (50mg), diphenhydramine (50mg), and methylprednisolone (80mg) is recommended for signs of angioedema.

*Hill MD, Lye T, Moss H, Barber PA, Demchuk AM, Newcommon NJ, GreenTL, Kenney C, Cole-Haskayne A, Buchan AM. Hemiorolingual angioedema and ACE inhibition after alteplase treatment of stroke. Neurology.2003;60:1525–1527.

All treatment decisions should be made in collaboration with your facility's neurological expert.

Intracranial Hemorrhage (ICH)

Initial Assessment of Intracranial Hemorrhage (ICH)

- Airway/breathing–low threshold for intubation
- Measure GCS; brainstem reflexes
- Send coagulation profile and platelets
- CT of head without contrast
 - Determine location and volume
 - Identify intraventricular blood or hydrocephalus
- Guidelines recommend SBP < 160mmHg; achieved with labetalol boluses (10-20mg) for SBP 160-200 and nicardipine infusion for SBP > 200, if available
- If suspicion for ICP or herniation, consider:
 - SBP goal is < 180 with MAP goal > 100 (2007 AHA/ASA guidelines)
 - Head-of-bed elevated at 30°
 - Patient's neck in a neutral position to maximize venous outflow
 - Minimizing the patient's agitation and pain
 - Hyperventilation
 - Hyperosmolar therapies–mannitol and hypertonic saline
 - Alert neurosurgery for possible clot evacuation and/or ventriculostomy

*AHA/ASA Guideline for the Management of Spontaneous Intracerebral Hemorrhage. Stroke. 2010;41:2108-2129.

Reversal of Coagulopathy in ICH

If INR is elevated, consider:

- Give 10mg IV vitamin K (slow infusion)
- Type & Cross for:
- 4 units FFP
 - Or
- Prothrombin complex concentrate (PCC) containing Factors II, VII, IX, and X at 30 units/kg
 - Or
- Consider activated Factor VII (Novo 7) 40mcg/kg
 - Off-label/compassionate use
 - Must be followed by FFP or INR will increase after a few hours
- Would give PCC for hemorrhages on new oral anticoagulant therapy

*AHA/ASA Guideline for the Management of Spontaneous Intracerebral Hemorrhage. Stroke. 2010;41:2108-2129.

All treatment decisions should be made in collaboration with your facility's neurological expert.

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Suggested Goals for Stroke Care

- Temperature < 37.2°C
- Blood Glucose < 160mg/dl
- HOB
 - Ischemic flat for 24 hours, unless poor control of secretions
 - ICH 30 degrees elevation
- Blood Pressure
 - 1) During tPA and Post tPA < 180/105 x 24 hours
 - 2) For patients NOT treated with tPA - Permissive HTN up to SBP < 220, DBP < 110 (should be individualized)
 - 3) S/P ICH—SBP < 160 & MAP > 100 unless suspect or known increased ICP, then SBP < 180 and MAP > 100 per 2007 AHA/ASA goals

All treatment decisions should be made in collaboration with your facility's neurological expert.

*AHA/ASA Guideline for the Early Management of Patients with Acute Ischemic Stroke. Stroke. 2013;44:870-947.

LERN STROKE TOOLKIT

Mini NIH Stroke Scale

For patients receiving tPA, the nurse should perform:

- Neuro checks (GCS and mini-NIHSS) every 15 minutes; notify physician for signs of neurological worsening (decline in GCS or increase in mini-NIHSS by 2 or more points).

	Time of tPA bolus	15 Minutes	30 Minutes	45 Minutes	1 Hour	1 Hour, 15 Minutes	1 Hour, 30 Minutes	1 Hour, 45 Minutes	2 Hours
Time									
BP									
HR									
GCS – eyes									
GCS – verbal									
GCS – motor									
GCS total									
LOC 1a									
LOC 1b									
LOC 1c									
Motor RUE									
Motor LUE									
Motor RLE									
Motor LLE									
Total mini-NIHSS									
Initials									
Intervention ? Y/N*									

1a. LOC Responsiveness: The examiner assesses patient's level of alertness and evaluates patient according to the stimuli required to arouse him/her.	0 = Alert; keenly responsive. 1 = Drowsy; arousable by minor stimulation 2 = Stuporous; requires repeated stimulation to attend, or is obtunded and requires strong or painful stimulation to make movements. 3 = Coma; responds only with reflex motor or autonomic effects or totally unresponsive, flaccid, and areflexic.
1b. LOC Questions: The patient is asked the month and his/her age. The answer must be correct-there is no partial credit for being close. If intubated, arbitrarily score 1.	0 = Answers both questions correctly. 1 = Answers one question correctly. 2 = Answers neither question correctly.
1c. LOC Commands: The patient is asked to open and close the eyes and then to grip and release the non-paretic hand. Demonstration is permitted.	0 = Performs both tasks correctly. 1 = Performs one task correctly. 2 = Performs neither task correctly.
Motor Arm: The limb is placed in the appropriate position: extend the arms (palms down) 45 degrees. Ten second count for arm. Motor Leg: The limb is placed at 30°. Five second count for leg. Demonstration is permitted. Each limb is tested in turn, beginning with the non-paretic side.	0 = No drift ; limbs holds for full count. 1 = Drift ; drifts before full count; does not hit the bed or other support. 2 = Some effort against gravity ; limb cannot get to, or maintain position, drifts to bed, but has some effort against gravity. 3 = No effort against gravity ; limb falls. 4 = No movement .

PERFORMANCE EVALUATION AND IMPROVEMENT

Overview

Who?

All LERN Level III Stroke Centers. LERN Level I and II Stroke Centers have reporting requirements to The Joint Commission or other Board approved credentialing agency and represent “Confirmed” levels. LERN Level IV Stroke Centers have no reporting requirements. LERN Level III Stroke Centers must submit quarterly reports to LERN in order to ensure that these centers are functioning at the standards set for a LERN Level III Stroke Center. The centers that submit data will be considered “Confirmed” levels.

Why?

The primary goal of LERN’s stroke system of care efforts is to develop a comprehensive stroke system of care in Louisiana to provide timely access to proven treatments necessary to reduce death and dependency. Your center has attested to LERN Level III Stroke Center capability. While LERN Level I and II Stroke Centers are held accountable by The Joint Commission or other Board approved credentialing agency through quarterly reports and on-site reviews, LERN seeks to develop a mechanism of confirming that LERN Level III Stroke Centers are functioning as Stroke Enabled Centers. The data collected by the Level III Stroke Centers will provide the LERN Stroke Medical Director with the opportunity to provide direction for improvement, when the need is identified or when assistance is requested. Persons who present with acute stroke deserve the opportunity to receive time-sensitive treatment with intravenous tissue plasminogen activator (IV tPA), which is the foundation of acute stroke care. LERN Level III Stroke Centers must demonstrate the timely administration of IV tPA to eligible patients. The data collection requirements focus on the time stamps for evaluation and management of the stroke patient who presents within the first few hours after onset.

1) Hospital Identifier

A unique letter code given to each hospital to anonymously distinguish one hospital’s data from another’s. For example, Baton Rouge General Medical Center’s identifier may be “AC” while Our Lady of the Lake Regional Medical Center’s identifier may be “ABD”. This identifier will be assigned by LERN.

2) Quarter

The quarter of the calendar year in which the data is being reported in the format of Q-YY (e.g., 1-15). Data should be submitted once per quarter.

For patient info:	Submit no later than:	Quarter reported:
January 1 – March 31	April 30	1-YY (e.g., 1-15)
April 1 – June 30	July 31	2-YY (e.g., 2-15)
July 1 – September 30	October 31	3-YY (e.g., 3-15)
October 1 – December 31	January 31	4-YY (e.g., 4-15)

3) **Date**

The date the patient arrived at the hospital.

4) **Patient ID #**

This shall be a facility-dependent “Dummy ID” so that identifiers can be eliminated from the transferred dataset to LERN. For example, a patient evaluated at Baton Rouge General Medical Center may be given Patient ID # “0001”.

5) **Time Last Seen Normal (LSN)**

This is the time (military time) that the patient was last known to be at his or her normal neurological condition. This time = the time of onset for:

- a. A person who was awake at onset and can provide his or her own history and
- b. A person with witnessed onset

6) **Time of Arrival to the Emergency Department Door**

This is the time (military time) that the patient was first acknowledged as being present at the LERN Level III Stroke Center. If the patient arrives by ambulance, this is the time the ambulance arrives at the LERN Level III Stroke Center. If the patient arrives by private vehicle or as a walk-in, this is the time stamp on the ED triage form.

*If the interval between LSN and arrival to the ED Door is **MORE THAN 3 HOURS**, then no further data elements are required for reporting. Collecting this data will assist in determining the number of patients who present to the hospital within the “window of opportunity” and will serve as a key metric for community education. Data collection for #1-6 applies to all patients admitted with ICD-9 diagnosis of 431 or 433-435.9 (Excluding 433.10 occluded carotid artery w/o cerebral infarct and 433.1 occlusion and stenosis of carotid artery).*

7) **Time of Arrival of Emergency Department MD**

This is the time (military time) the ED physician first documents a face-to-face encounter with the patient with suspected stroke who presents within the first three hours after last seen normal. The **goal is 10 minutes** from the Time of Arrival to the Emergency Department Door.

8) **Time of Communication with Neurological Expertise**

This is the time (military time) when a neurological expert is first contacted (in person, by telephone, or by telemedicine) by a physician at the LERN Level III Stroke Center to discuss the patient with suspected stroke who presents within the first three hours after last seen normal. The best practice **goal is 15 minutes** from the Time of Arrival to the Emergency Department Door. A LERN Level III Stroke Center may have a neurological expert who prefers to have the CT scan and laboratory findings available prior to the first communication. LERN strongly recommends that LERN Level III Stroke Centers initiate contact with their neurological expert to inform him or her of the patient with suspected stroke within the first 15 minutes from the Time of Arrival to the Emergency Department Door and document this time. A follow-up communication with the neurological expert can follow when the CT scan +/- laboratory findings are available.

9) **Credentials of Neurological Expertise**

Please indicate: Neurologist, Vascular Neurologist, Emergency Medicine Physician, or Other.

10) Time of CT Done

This is the time (military time) of the time stamp on the baseline CT scan of the head. The **goal is 25 minutes** from the Time of Arrival to the Emergency Department Door.

11) Time of CT Interpret

This is the time (military time) when the interpretation of the baseline CT scan of the head becomes available by whomever is responsible for reading it (on-site or off-site radiologist or neurological expert, provided he or she is credentialed for interpretation of neuroimaging at the center). The **goal is 45 minutes** from the Time of Arrival to the Emergency Department Door. Each Level III hospital defines who is credentialed to interpret the CT scan via internal hospital by-laws. The LERN Documentation Tool lists the following pick list to facilitate tracking of the individual making the interpretations: Neurologist, Neurosurgeon, ED Physician, Hospitalist, Intensivist, Resident Physician, Nurse Practitioner, Physician Assistant, or Other.

12) Time to Labs Complete

This is the time (military time) when the following laboratory values are available for patients with suspected stroke who present within the first three hours after last seen normal: platelet count, PT/INR (PTT, when appropriate), and glucose. The **goal is 45 minutes** from the Time of Arrival to the Emergency Department Door.

NOTE: The American Heart Association/American Stroke Association has issued this statement in the 2013 Guidelines for the Early Management of Patients With Acute Ischemic Stroke: “Although it is desirable to know the results of these tests before giving intravenous recombinant tissue-type plasminogen activator, fibrinolytic therapy should not be delayed while awaiting the results unless:

- a. There is clinical suspicion of a bleeding abnormality or thrombocytopenia,
- b. The patient has received heparin or warfarin,
- c. The patient has received other anticoagulants (direct thrombin or direct factor Xa inhibitors).”

13) Time to Needle for tPA

This is the time (military time) when the bolus of tPA is pushed IV in the patient with suspected stroke who presents within the first three hours after last seen normal. The **goal is 60 minutes** from the Time of Arrival to the Emergency Department Door and represents the “Door-to-Needle time.” Every minute, up to two million brain cells are destroyed during a large artery occlusive stroke. Systematic improvement in the Door-to-Needle time should be a priority for all LERN Level I, II, and III Stroke Centers. The reason(s) for not administering IV tPA should be recorded.

14) Reason why patient who presents in less than 2 hours of last seen normal (LSN) not treated with tPA

The LERN Documentation Tool lists the following pick list to facilitate tracking of this metric: Not Present 3 Hrs, Hemorrhage on CT, Active Internal Bleeding, Abnormal PTT, Recent Previous Stroke, Hypodensity on CT, Intracranial Neoplasm, Seizure, Patient / Family Refusal, Unable to treat within 4.5 hr window, Clinical Suspicion of SAH, Other Known Bleeding Diathesis, Full Dose Anticoagulation, Recent Surgery, AVM, Minimal Deficit, Blood Glucose too high or low, Elevated BP, Not Present in 4.5 Hours, History of Past ICH, INR > 1.7, Platelet Count Low, Recent Serious Trauma, Unsecured Cerebral Aneurysm, Symptoms resolved, High NIHSS Score, or Other.

LERN STROKE TOOLKIT

Data Submission to LERN

LERN expects to receive quarterly data reports including Data Elements 1-3 for all patients presenting with suspected stroke and Data Elements 4-9 for patients with suspected stroke who presents within the first 3 hours after last seen normal, with a 30-day maximum interval between close of a quarter and receipt of the data.

Email the completed data form quarterly to Cassandra.Woods@la.gov.

Date of end of quarter	Date data report is last acceptable
March 31, 2014	April 30, 2014
June 30, 2014	July 30, 2014
September 30, 2014	October 31, 2014
December 31, 2014	January 31, 2014

How much time is involved in the data collection process?

The data collection (if retrospective) would take a maximum of 20 minutes per case, for patients who present within the first three hours from last seen normal. For cases only requiring Dummy ID, time of last seen normal, and time of Arrival to the Emergency Department Door, each case would take a maximum of five minutes.

Our high-volume center sees about 40 patients with suspected stroke per month of whom about 20 present within three hours of last seen normal. Completion of this data collection tool takes eight hours per month.

To get a better estimate of your time commitment:

- 1) Ask one of your hospital coders to pull a list of all patients with stroke diagnosis codes over the last three-month period. The ICD-9 diagnosis codes are of 431 and 433-435.9. (Excluding 433.10 occluded carotid artery w/o cerebral infarct and 433.1 occlusion and stenosis of carotid artery).
- 2) Get with the Guidelines (GWTG) estimates the percentage of patients presenting within three hours is < 25%. Calculate what 25% of all patients with stroke diagnosis codes would represent. This would be an estimate of total quarterly sample size.
- 3) Divide that # by three (three cases can be collected per hour) → estimated # hours per quarter devoted to the process of data collection.

Who should be responsible for collecting this data?

This will vary and is to be determined by each hospital. Some facilities assign data collection to the following existing employees:

- Stroke director
- Stroke coordinator
- Quality department
- Emergency department nursing director
- Emergency department clinical supervisor
- Emergency department charge nurse

What are your options if you decline participation?

- 1) Change attestation to LERN Level IV
- 2) Accept designation of LERN Level III Unconfirmed

How can you improve the acquisition of these data elements?

One tip from your LERN Stroke Medical Director is to create a template in the ED medical chart (whether paper or electronic) that includes these timestamp data points and encourage your ED staff (MD and RNs) to document the data points that consume time when collected retrospectively (time last seen normal, time of Arrival of Emergency Department MD, time of communication with Neurological Expertise).

Data Collection Form

[illegible]

Each hospital will be issued a unique hospital identifier, which will only be shared with the associated hospital. ALL data will be accumulated and organized in summary form. LERN will not release any identified data related to a participating hospital. To obtain the unique hospital identifier, please contact Vanessa McKee at (225) 756-3440.

The data collection tool is located on the LERN website at <http://lern.la.gov/lern-stroke-system/stroke-data-collection/>.

Telemedicine Contacts (HUB Hospitals)

The following hospitals are providing neurological consultations via telemedicine or a phone consultation.

- 1) **Ochsner**
Liz Cothren: 504-842-0175 / ecothren@ochsner.org
- 2) **Tulane**
Martha Gragg: 318-863-0540 / martha.gragg@hcahealthcare.com
- 3) **Specialists on Call**
Jerry Kovalic: 817-403-4449 / Kovalic@soctelemd.com
- 4) **Interim LSU Hospital**
Toni Rougeou, RN: 504-903-4447 / trouge@lsuhsc.edu
- 5) **Our Lady of the Lake**
Pete Sullivan: 225-765-8552 / Peter.Sullivan@ololrmc.com
- 6) **Our Lady of Lourdes**
Allen Aubert: 337-470-2905 / allen.aubert@lourdesrmc.com
- 7) **Lafayette General Hospital**
Cathy Palmer: 337-289-7893 / cpalmer@lgmc.com

Stroke Core Measures (Joint Commission)

If any of the below core measures are not carried out and documented, documentation must reflect WHY the action was not done:

- 1) tPA considered
- 2) Receives antithrombotic meds by end of day two
- 3) Receives DVT prophylaxis by end of day two
- 4) Discharged on antithrombotic
- 5) If diagnosis of atrial fibrillation, discharge on anticoagulation or document contraindication
- 6) Obtains lipid profile within 48 hours (or 30 days prior)
- 7) Screened for dysphagia prior to any PO intake
- 8) Receives stroke education- verbal and written form
 - Review of personal risk factors, medications prescribed, warning signs and symptoms, how to activate EMS, and importance of follow up
- 9) Receives info on smoking cessation (if applicable-smoker within last yr) -Verbal counseling and treatment/medications offered
- 10) Plan for rehab is considered

Notes about dysphagia screening⁴:

- 1) Stroke is a major cause of dysphagia and can lead to aspiration
- 2) 1/3 of patients who aspirate develop pneumonia; this is associated with increased risk of death.
- 3) A dysphasia screen is intended to identify which patients need a complete dysphagia assessment. Screens can be performed by nursing or medical staff; assessments should be performed but therapists.
- 4) The choice of which dysphagia screen is used is hospital determined.
- 5) Patients suspected of stroke should be given nothing by mouth until given a "PASS" on a dysphagia screen. A "PASS" on a dysphagia screen does NOT indicate the safety of dietary intake by mouth, but may represent the safety of taking medications with sips of water.

⁴ Donovan NJ et al. Dysphagia Screening: State of the Art: Invitational Conference Proceeding From the State-of-the-Art Nursing Symposium, International Stroke Conference 2012. Stroke 2013;44:e24-e31.

LERN STROKE TOOLKIT

RESOURCES

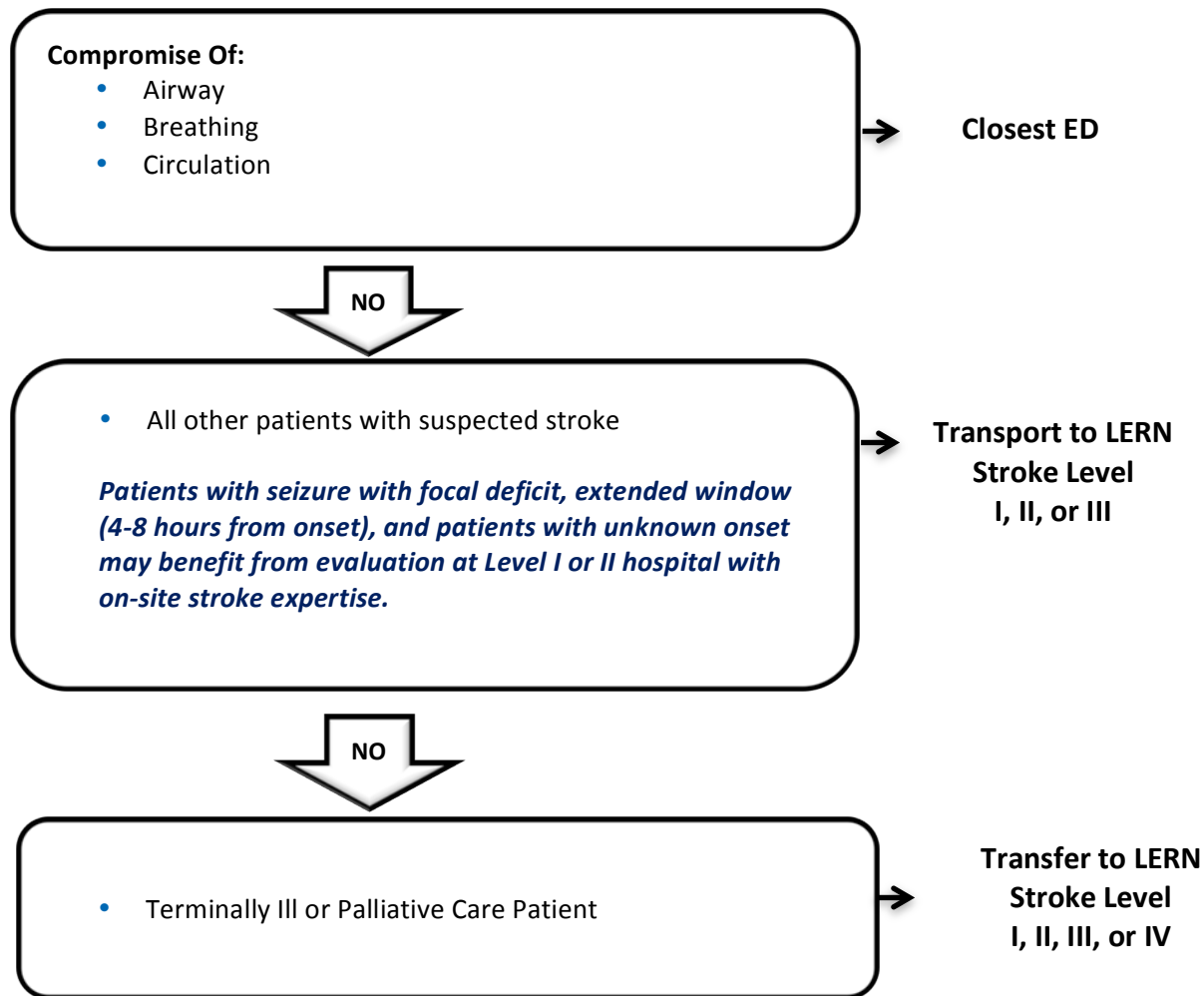
10 P's of Stroke: Causes, Pathophysiology, Evaluation, and Management Tool

1. Pump	<ul style="list-style-type: none">•Abnormal Structure, function, or rhythm can cause or complicate stroke•Work-up will include telemetry and echocardiography
2. Pressure	<ul style="list-style-type: none">•High Blood Pressure (BP) is the #1 risk factor for stroke•Pressure or blood reaching the brain = systemic pressure = pressure inside of the head
3. Perfusate	<ul style="list-style-type: none">•This is blood, which must have sufficient volume, oxygen, and glucose and must not be too viscous or prone to clotting•Lab tests will be ordered
4. Pipes	<ul style="list-style-type: none">•Arteries that carry blood to the brain•Can be blocked by clots and plaques, leading to ischemic stroke•Can break, leading to hemorrhagic stroke•Will be assessed by diagnostic tests
5. Plumbing	<ul style="list-style-type: none">•Communication of arteries to the brain•If there is good plumbing, the damage from loss of an artery is minimized
6. Perfusion	<ul style="list-style-type: none">•The movement of blood through the brain•Diagnostic tests can determine if flow is adequate
7. Parenchyma	<ul style="list-style-type: none">•CT and/or MRI scans provide information on ischemic and hemorrhagic brain injury
8. Penumbra	<ul style="list-style-type: none">•Penumbra is the part of the brain that has inadequate flow, but has not yet died•Up to two million brain cells die each minute during stroke
9. Physical rehabilitation and Recovery	<ul style="list-style-type: none">•Physical therapy for gait training and strengthening•Occupational therapy for activities of daily living training, fine motor movements, visual issues, and neglect•Speech therapy for production of speech, language, swallowing, and cognition.•Intensive rehab increases the likelihood of going home rather than being institutionalized
10. Prevention	<ul style="list-style-type: none">•Behavioral changes and medications to keep:<ul style="list-style-type: none">•BP < 120/80•Fasting glucose < 110mg/dl•Antiplatelet or anticoagulant to prevent clotting•No smoking, illicit drugs, or excessive alcohol use

LERN STROKE TOOLKIT

LERN Destination Protocol (Pre-Hospital)

The following protocol applies to patients with suspected stroke:



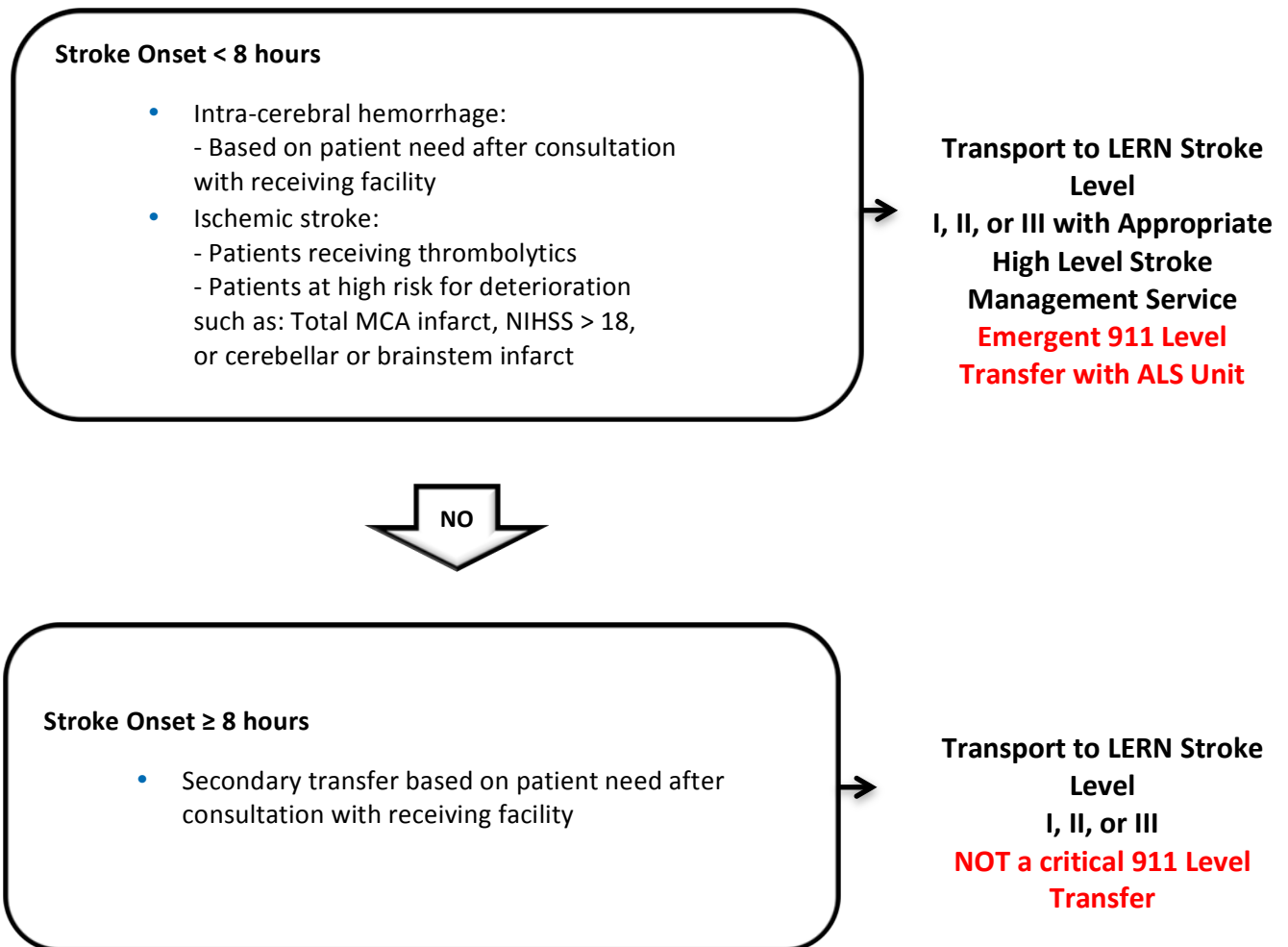
Guiding Principles:

- Time is the critical variable in acute stroke care.
- Protocols that include pre-hospital notification while en route by EMS should be used for patients with suspected acute stroke to facilitate primary destination efficiency.
- Treatment with intravenous tPA is the only FDA approved acute therapy for stroke.
- EMS should identify the geographically closest facility capable of providing tPA treatment.
- Transfer patient to the nearest hospital equipped to provide tPA treatment.
- Secondary transfer to facilities equipped to provide tertiary care and interventional treatments should not prevent administration of tPA to appropriate patients.

LERN STROKE TOOLKIT

LERN Transfer Guideline: Stroke

The following guideline applies to patients with suspected stroke requiring transfer:

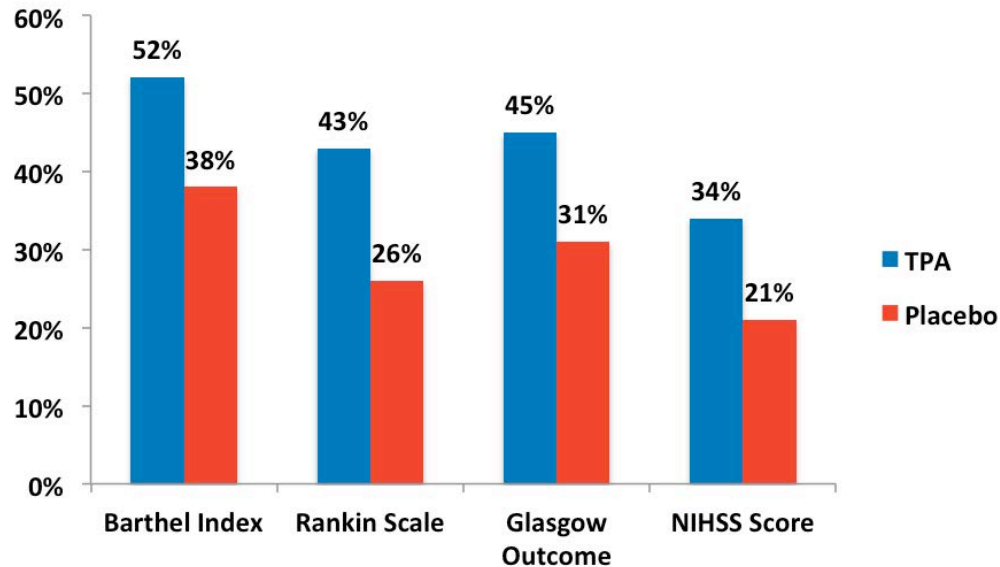


* Based on current recommendations from AHA/ASA outlined in the document *"Interactions Within Stroke Systems of Care."* Protocols for interhospital transfer of patients should be established and approved beforehand so that efficient patient transfers can be accomplished at all hours of the day and night.

LERN STROKE TOOLKIT

AHA/ASA Target: Stroke Statistics

NINDS tPA Stroke Trial

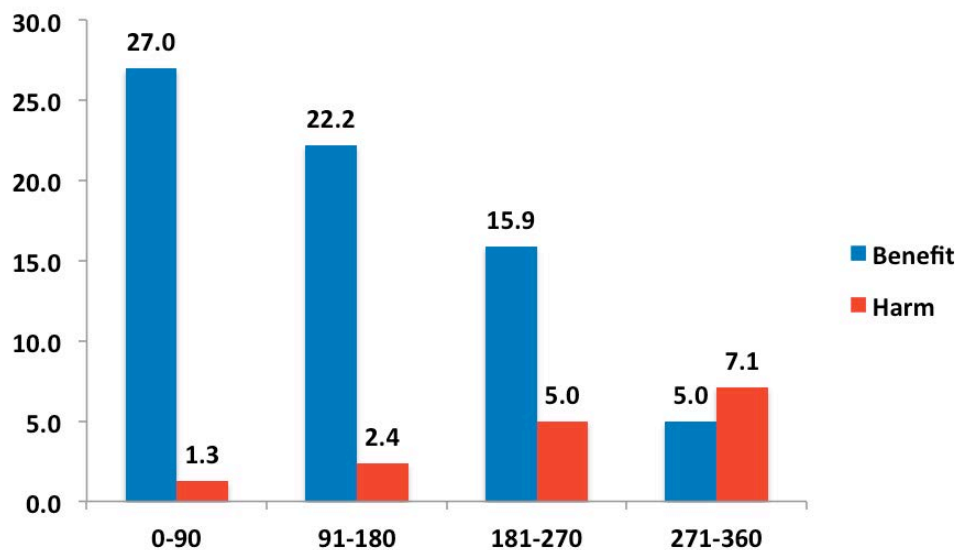


Global outcome statistic: OR = 1.7, 50% v. 38% = 12% benefit

N Engl J Med 1995;333:1581-7

From American Heart Association, Target: Stroke

Number of Patients Who Benefit and Are Harmed per 100 Patients tPA Treated in Each Time Window



Lansberg et al, Stroke 2009

Number Needed to Treat to Benefit from IV tPA Across Full Range of Functional Outcomes

<u>Outcome</u>	<u>NNT</u>
Normal/Near Normal	8.3
Improved	3.1

For every 100 patients treated with tPA,
32 benefit, 3 harmed

Better outcome by 1 or more grades on the mRS

Saver JL et al Stroke 2007; 38:2279-2283

From American Heart Association, Target: Stroke

All the Necessary Components

For timely, but safe and effective, acute ischemic stroke care, the following components are necessary:

- Early identification of a candidate for thrombolysis
- Activation of a stroke team
- Evidence-based, readily assessable, effective protocols
- Rapid ordering, acquisition, and interpretation of brain imaging
- Accurate and rapid physician orders
- Reliable intravenous tPA treatment administration
- Coordinated patient monitoring
- Ongoing assessment
- Accurate time logs for tracking and timely data feedback

From American Heart Association, Target: Stroke

LERN STROKE TOOLKIT

For more information about LERN or the Stroke System of Care, visit LERN's website: www.lern.la.gov.

Key Contact Information:

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